

NON-PUBLIC?: N
ACCESSION #: 9312100179
LICENSEE EVENT REPORT (LER)

FACILITY NAME: St. Lucie Unit 2 PAGE: 1 OF 03

DOCKET NUMBER: 05000389

TITLE: Manual Reactor Trip Due To High Gas Temperatures In The
Main Generator Caused By A Procedural Deficiency
EVENT DATE: 11/02/93 LER #: 93-008-00 REPORT DATE: 12/01/93

OTHER FACILITIES INVOLVED: N/A DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 045

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: Robert J. Young, Shift Technical TELEPHONE: (407) 465-3550
Advisor

COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT:

On November 2, 1993, St Lucie Unit 2 was in Mode 1, operating at 45% power. At 0443 hours the control room annunciator for the main generator hydrogen system panel actuated. Utility licensed operators checked the hydrogen gas temperatures and saw that the average cold gas temperature was increasing. Before any attempts to reduce the hydrogen gas temperatures could be initiated, the average cold gas temperature reached the limit in the off-normal procedure. At 0447 hours, in accordance with Off-Normal Operating Procedure 2-200030 "Main Generator", a manual reactor and turbine trip were initiated. Standard Post Trip Actions were performed as per EOP-1. Safety function status checks were performed as per EOP-2 Reactor Trip Recovery and the plant was stabilized in Mode 3, Hot Standby.

The root cause for the increase in the main generator hydrogen gas

temperatures was due to the operation of the turbine cooling water system with two turbine lube oil coolers lined up to receive turbine cooling water flow and only one turbine cooling water pump available. The turbine cooling water operating procedure permits the isolation of one lube oil cooler that is not in use to maximize flow to those cooling systems in service. Based on plant conditions at 45%, utility licensed operators decided to maintain both turbine lube oil coolers in service.

Corrective Actions for this event: 1) Plant personnel verified that the turbine lube oil cooling system configuration was the cause for the event by reproducing system conditions just prior to the trip. 2) Utility operators isolated a turbine lube oil cooler. 3) The generator vendor verified that the hydrogen gas temperatures experienced during this event would not adversely affect the main generator. 4) I&C verified that the turbine cooling water and component cooling water temperature control valves were operating properly. 5) The plant operating procedure will be enhanced to clarify requirements for operation of the turbine cooling water system.

END OF ABSTRACT

TEXT PAGE 2 OF 3

DESCRIPTION OF THE EVENT

On November 2, 1993, St. Lucie Unit 2 was in Mode 1 and operating at 45% power in order to allow unit operation until the end of the fuel cycle in February 1994 for a scheduled refueling outage. At 0443 hours the control room annunciator for the main generator hydrogen system panel (EHS:TK) actuated. Utility licensed operators checked the hydrogen gas temperatures and saw that the average cold gas temperature was increasing. Utility operators were dispatched to check the main generator hydrogen cooling system and the turbine lube oil cooling system (EHS:TD), as these are the largest loads on the turbine cooling water system (EHS:KB). No anomalies were noted in the hydrogen cooling system. However, the operator at the turbine lube oil coolers noted that turbine cooling water flow to the oil coolers was twice what had been noted earlier. Before any attempts to reduce the hydrogen gas temperatures could be initiated, the average cold gas temperature reached the limit in the off-normal operating procedure. In accordance with Off-Normal Operating Procedure 2-2200030 "Main Generator" a manual reactor and turbine trip was initiated. Standard Post Trip Actions were performed as per Emergency Operating Procedure EOP-1. The trip was an uncomplicated reactor trip with all safety functions being met. Four sets of safety function status checks were performed in accordance with Emergency Operating Procedure EOP-2, Reactor Trip Recovery, and the unit

was stabilized in Mode 3, Hot Standby. Hydrogen gas temperatures returned to nominal values following the reactor and turbine trip.

CAUSE OF THE EVENT

The root cause for the temperature increase of the hydrogen gas in the main generator was due to the operation of the turbine cooling water (TCW) system with two turbine lube oil coolers lined up to receive TCW flow and only one TCW pump available. The Operating Procedure 2-0330020 "Turbine Cooling Water System Normal Operation" permits the isolation of TCW to the lube oil cooler that is not in use to maximize TCW flow to those cooling systems in service. While the unit power was reduced, various secondary side components were removed from service to allow preventive maintenance or overhaul. Based on plant conditions utility licensed operators decided to maintain TCW to both of the turbine lube oil coolers.

ANALYSIS OF THE EVENT

This event is reportable under 10CFR 50.73.a.2.iv as "any event or condition that resulted in manual or automatic actuation of any engineered safety feature, including the reactor protection system". The Assistant Nuclear Plant Supervisor directed Licensed Operators to manually trip the reactor and turbine in accordance with Off-Normal Operating Procedure 2-2200030 "Main Generator" due to the high hydrogen gas temperatures in the main generator that could lead to equipment damage. The hydrogen cooling system's function is to remove heat produced during operation of the main generator. The plant response to this event is bounded by Section 15.2.1.2 of the St. Lucie Unit 2 FUSAR which assumes a decreased heat removal by the secondary system due to the isolation of the turbine at 102% power. The actual plant response was more conservative than described in the analysis for the following reasons: 1) The unit was at a reduced power, 45%. 2) The reactor and turbine were manually tripped. 3) Neither steam generator had water level decrease below 40% narrow range. Therefore, the capability of the steam generators to act as a primary heat sink was not in jeopardy. The health and safety of the public was not affected by this event.

TEXT PAGE 3 OF 3

CORRECTIVE ACTIONS

1) Utility licensed operators performed a manual reactor and turbine trip in accordance with Off-Normal Procedure 2-2200030 "Main Generator".

- 2) Plant personnel verified that the turbine lube oil cooling system configuration was the cause of the event by reproducing system conditions similar to those conditions just prior to the trip and verifying TCW system response.
- 3) The generator vendor verified that the hydrogen gas temperatures experienced during this event would not adversely affect the main generator.
- 4) I&C verified that the temperature control valves in the TCW and the component cooling water systems were operating properly.
- 5) Utility operators isolated a turbine lube oil cooler as permitted by the Operating Procedure 2-0330020 "Turbine Cooling Water System Normal Operation".
- 6) Operating Procedure 1 & 2-0330020 "Turbine Cooling Water System Normal Operation" will be enhanced to clarify requirements for operation of the TCW system.

ADDITIONAL INFORMATION

Component Failures

There were no component failures involved with this event

Previous Similar Events

This is the first event in which increasing main generator gas temperatures necessitated a manual unit trip.

ATTACHMENT TO 9312100179 PAGE 1 OF 1

P.O. Box 128, Ft. Pierce, FL 34954-0128

December 1, 1993

FPL

L-93-298

10 CFR 50.73

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

Re: St. Lucie Unit 2
Docket No. 50-389
Reportable Event: 93-008
Date of Event: November 2, 1993
Manual Reactor Trip due to High
Gas Temperatures in the Main Generator
Caused by a Procedural Deficiency

The attached Licensee Event Report is being submitted pursuant to the requirements of 10 CFR 50.73 to provide notification of the subject event.

Very truly yours,

D. A. Sager
Vice President
St. Lucie Plant

DAS/JWH/kw

Attachment

cc: Stewart D. Ebnetter, Regional Administrator, USNRC Region II
Senior Resident Inspector, USNRC, St. Lucie Plant

DAS/PSL #1024-93

an FPL Group company

*** END OF DOCUMENT ***
